

WHAT IS CLAIMED IS:

- 1 1. A method of processing observed data, comprising steps of:
2 receiving a first signal coming from a medium for a predetermined
3 time period as a first data set;
4 receiving a second signal coming from the medium for the
5 predetermined time period as a second data set;
6 plotting the first data set and the second data set on a
7 two-dimensional orthogonal coordinate system; and
8 rotating the first data set and the second data set plotted on the
9 coordinate system by a rotating matrix to separate a signal component and a
10 noise component contained in the observed data.
- 1 2. The signal processing method as set forth in claim 1, further
2 comprising a step of subjecting the signal component to a frequency analysis
3 to determine a fundamental frequency of the signal component.
- 1 3. A signal processor, in which the signal processing method as set forth
2 in claim 1 is executed.
- 1 4. A pulse photometer adapted to observe a pulse wave of a living body,
2 comprising
3 a light emitter, adapted to irradiate the living body with a first light
4 beam having a first wavelength and a second light beam having a second
5 wavelength which is different from the first wavelength;

6 a converter, operable to convert the first light beam and the second
7 light beam, which have been reflected or transmitted from the living body, into
8 a first data set corresponding to the first wavelength and a second data set
9 corresponding to the second wavelength; and
10 a processor, operable to process the first data set and the second
11 data set with a rotating matrix to separate a signal component and a noise
12 component contained in the pulse wave.

1 5. The pulse photometer as set forth in claim 4, wherein:
2 the processor is operable to plot the first data set and the second data
3 set on a two-dimensional orthogonal coordinate system constituted by a first
4 axis corresponding to the first data set and a second axis corresponding to the
5 second data set; and
6 the first data set and the second data set plotted on the coordinate
7 system are to be rotated by the rotating matrix.

1 6. The pulse photometer as set forth in claim 4, wherein the first data set
2 and the second data set are obtained for a predetermined time period
3 consecutively.

1 7. The pulse photometer as set forth in claim 5, wherein a rotating angle
2 of the rotating matrix is determined such that a distribution range of the first
3 data set and the second data set which are projected on one of the first axis
4 and the second axis is minimized.

1 8. A pulse photometer, comprising
2 a light emitter, adapted to irradiate a living body with a first light beam
3 having a first wavelength and a second light beam having a second
4 wavelength which is different from the first wavelength;
5 a converter, operable to convert the first light beam and the second
6 light beam, which have been reflected or transmitted from the living body, into
7 a first data set corresponding to the first wavelength and a second data set
8 corresponding to the second wavelength; and
9 a processor, operable to:
10 plot the first data set and the second data set on a
11 two-dimensional orthogonal coordinate system corresponding to the first
12 wavelength and the second wavelength;
13 calculate a first norm value for the first data set and a second
14 norm value for the second data set to obtain a norm ratio of the first norm
15 value and the second norm value; and
16 obtain a concentration of at least one light-absorbing material in
17 blood of the living body, based on the norm ratio.

1 9. The pulse photometer as set forth in claim 8, wherein the
2 concentration of the light-absorbing material is at least one of an oxygen
3 saturation in arterial blood, a concentration of abnormal hemoglobin in arterial
4 blood, and a concentration of injected dye in arterial blood.

1 10. The pulse photometer as set forth in claim 4, wherein the processor is
2 operable to:

3 subject the signal component to a frequency analysis to determine at
4 least one of a fundamental frequency of the pulse wave and a pulse rate of the
5 living body; and

6 obtain a concentration of at least one light-absorbing material in blood
7 of the living body, based on at least one of the fundamental frequency and the
8 pulse rate.

1 11. The pulse photometer as set forth in claim 10, wherein the
2 concentration of the light-absorbing material is at least one of an oxygen
3 saturation in arterial blood, a concentration of abnormal hemoglobin in arterial
4 blood, and a concentration of injected dye in arterial blood.